

# A PAINT SPRAY GUN

## Field of the Invention

This invention concerns a new type of thread. This new type of thread can be used to connect the body of a spray paint gun with its air nozzle ring.

## Background of the Invention

In certain known paint spray guns the thread that connects the body of the gun and the air nozzle ring is a DIN 13 fine thread. The nominal diameter of the thread is between M 30 and M 38. Pitches of 1.0 mm, 1.5 mm and 1.75 are common. With this type of thread a precise centering of the air nozzle relative to the paint nozzle is possible, which is a precondition of good spray results.

However, the use of fine thread has disadvantages. The best known disadvantage is that when the thread gets dirty, its cleaning is time consuming. A further disadvantage is that at least five revolutions are necessary to screw the air nozzle ring onto the gun body or to unscrew it. Furthermore, cross-threading often occurs when the air nozzle ring is screwed onto the outer thread of the body of the gun, resulting in damage to the thread.

To overcome these disadvantages the present inventor has considered replacing the fine thread with a trapezoid thread. A metric ISO-trapezoid thread is described in

1 DIN 103. However, the inventor has found that a standard trapezoid thread would also  
2 have disadvantages. A standard trapezoid thread would require reinforcement of the wall  
3 of both the gun body and the air nozzle ring in the area of the trapezoid thread. This  
4 would increase the weight of the gun body by approximately 10%, and thus increase the  
5 weight of spray guns, increasing the strain on the user. Another potential disadvantage  
6 could result from the large flank clearance of a standard trapezoid thread which may  
cause cross-threading of the air nozzle ring and cause the ring to lean to one side. As a  
result of this, the centers of the air nozzle and the paint nozzle would not be in alignment,  
negatively affecting the paint stream. Investigation by the inventor also showed that the  
substantially larger pitch of the usual trapezoid thread did not make it easier to clean the  
thread as compared to the fine thread. Thus, it is proposed to modify the standard  
trapezoid thread to improve its usefulness as a connector of a gun body and a nozzle ring.

13 Summary of the Invention

14 ~~The spray paint gun of the present invention comprises a gun body having a male~~  
15 ~~thread and an air nozzle ring having female thread, the female thread being adapted to be~~  
16 ~~screwed onto the male thread. The threads are trapezoidal threads having their flank~~  
17 ~~angles in the range of about +/- 20% of 30 degrees. The thread diameter is between about~~  
18 ~~30 and about 40 mm, the thread height is within the range of about +/- 20% of 1.1 mm,~~  
19 ~~the root to crest clearance is within the range of about +/- 20% of 0.1 mm, and the flank~~

clearance is within the range of about  $\pm 20\%$  of 0.15 mm. In this embodiment the pitch may be in the range of about  $\pm 20\%$  of 2.5mm. The core diameter and the outer diameter of the male thread of the gun body may have a tolerance in the range of about  $\pm 20\%$  of -0.05 mm, respectively. The core diameter and the outer diameter of the female thread of the air nozzle ring may have a tolerance in the range of about  $\pm 20\%$  of +0.1 mm, respectively. The pitch may have a tolerance in the range of about  $\pm 20\%$  of 0.1 mm.

#### Advantages

The thread of present invention can have a number of advantages over the fine thread commonly used to connect the body of a spray gun to the nozzle ring. In particular, the modified thread of the present invention is more resistant to dirt, requires fewer revolutions to screw the nozzle on or to unscrew it and suffers from cross-threading less frequently. The thread of the present invention also has a number of advantages over a standard trapezoid thread. The modified thread does not require thickening of the threaded walls of the air nozzle ring or of the body of the gun, which, if required, would add to the overall weight of the gun. Also, the thread of the present invention causes the air nozzle ring to be perfectly centered when screwed onto the gun body. In addition it is less sensitive to dirt and requires fewer revolutions to screw on the air nozzle ring or unscrew it.

1 An example of a modified thread of the present invention that has all the above  
2 stated desirable features is described below. However, it should be understood that while  
3 it is advantageous that the modified thread has one or more of those desirable features, the  
4 present invention does not require the modified thread to have all or any of those features.  
5 The present invention shall also be understood to include those advantages and  
6 variations a person skilled in the art could deduct from the example given below, from the  
7 specification as a whole, and from use of the invention.

8 Detailed Description of a Preferred Embodiment of the Invention

9 To illustrate a preferred embodiment the metric ISO trapezoid DIN 103 thread  
10 having the dimensions 38 x 3 is compared with a modified trapezoid thread according to  
11 the invention having a nominal diameter of 38 mm.

12 ~~In both cases the flank angle is about 30° and the outer diameter of the male thread~~  
13 is about 38 mm. The pitch in the standard thread is 3 mm and in the modified thread  
14 about 2.5 mm. The outer diameter of the female thread is in the standard thread 38.5 mm  
15 and is in the modified thread about 38.2 mm. The core diameter of the male thread is, in  
16 the case of the standard thread, 34.5 mm and in the case of the modified thread, about  
17 35.8 mm. The core diameter of the female thread is in the standard thread 35 mm and in  
18 ~~the modified thread about 36 mm.~~

Qmsa<sup>3</sup> / a3 Thus, in a standard thread the thread height of both the male and female thread is

1.75 mm (overall height 3.5 mm). In the modified thread the thread height of both the male and female thread is about 1.1 mm (overall height about 2.2 mm). The crest to root clearance of the standard thread is 0.25 mm, and of the modified thread about 0.1 mm.

The flank clearance of the standard thread is 0.22, and in the modified thread about 0.15.

In the modified thread the core diameter and the outer diameter of the male thread have a tolerance of -0.05 mm, respectively, the core diameter and the outer diameter of the female thread have a tolerance of +0.1 mm, respectively, and the pitch has a tolerance of +/- 0.1 mm.

Other examples of preferred embodiments and less preferred embodiments can be deducted from the example given above and the specification as a whole.